What is causing my hay fever?

Description

It's that time of year again when grass pollen is in the air across the UK. For many people this brings all the symptoms of hay fever: runny nose, itchy eyes, and sneezing. The NHS says hay fever is one of the most common allergic conditions, with an estimated 13 million people affected in the UK. If you are one of those affected, or you know someone who is, you might want to understand what is causing hay fever, and what you can do to minimise symptoms.

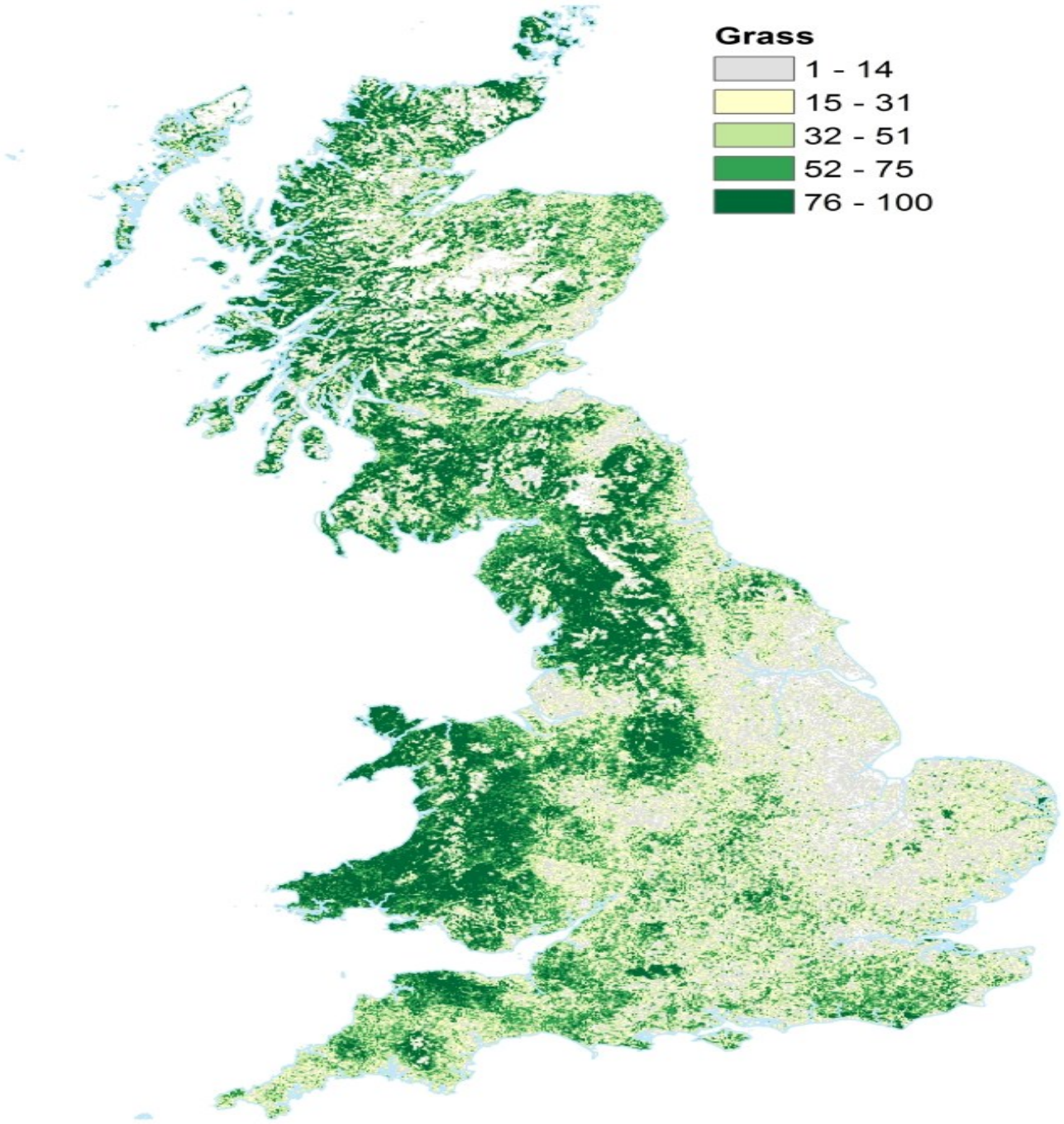
Rachel McInnes is a senior climate impacts scientist at the Met Office working on climate interactions with health, while helping to advance pollen research. In this post she explores all things pollen related:

Hay fever is caused by allergenic pollen released by certain grasses, trees and weeds. Pollen contains proteins that can cause the nose, eyes, throat and sinuses to become swollen, irritated and inflamed. Grains of pollen are released into the air from these types of plants when they flower. From here, people can breathe in the pollen grains.

Pollen can disperse long distances and, depending on the weather conditions, can travel a huge distance from the plant. Lots of meteorological conditions influence when pollen is released, how much is produced, and where it travels. Wind speed, direction and rain affect pollen levels in the air. When it rains pollen is 'washed out' of the atmosphere and brought to the ground, where we can't breathe it in. Sufferers often notice symptoms improve on wet days. Although pollen can travel huge distances (even from country to country), most pollen travels less than 20km, and the majority doesn't go further than a few kilometres.

Recently researchers from the Met Office joined with scientists from the University of Exeter to produce maps of allergenic trees, grass and weeds in the UK (see grass map example below) *. These maps provide a good indication of the distribution of different allergenic plants, and they can be used to improve understanding of pollen impacts on health. They are also a step towards a pollen forecast which, when combined with weather data, could provide detail about pollen from individual species.

** This work was part of the Health Protection Research Unit in Environmental Change and Health , and collaborators on the mapping work included researchers from the Devon Wildlife Trust, The University of Worcester, Bluesky International and Public Health England.*



Map of grass density in the UK. Units are percentage cover of grass per 1km x 1km grid square. Image Crown Copyright, 2016, The Met Office. Based on digital spatial data licensed from the Centre for Ecology & Hydrology, copyright NERC (CEH).

These different trees, grasses and weeds produce pollen at different times during the 'pollen season':

- The UK pollen season begins with trees coming into flower, which can be as early as January or February, and peaks from mid March to May.
- Grasses in the UK flower from mid May to July. This is when most people experience symptoms, with grass pollen being the most common UK allergen for asthma and hay fever.
- Finally, weed pollen is present from the end of June to September. Noticing the time of year

sufferers experience symptoms may help understand which of these plants they are most allergic to.

What can be done to manage hay fever and reduce symptoms?

Firstly, stay informed about when pollen levels are highest in your area by looking at our pollen forecast. To get the latest pollen forecast, view our Pollen forecast which provides a UK forecast of the pollen count and provides sufferers with an early warning. You can also download our free app to get daily updates of pollen alerts in your region to your phone or tablet. The Met Office runs the only pollen-count monitoring network in the UK and we provide a forecast up to five days ahead during the pollen season.

On days where the pollen levels are high in your area, try to avoid pollen as much as possible. For example:

- Keep windows closed when at home and overnight. Most pollen is released in the early morning and falls to ground level in the evenings, when the air cools.
- After being outside, change clothes, shower and wash hair to remove pollen.
- Avoid drying clothes outside when pollen counts are high. If you do, shake items before bringing them inside.
- Other tips about avoiding exposure to pollen can be found here.

How might things improve in the future for hay fever sufferers?

The Met Office is part of a team of researchers investigating grass pollen in the UK, using state-of-the-art genomic technology to read the DNA ‘barcode’ of grass pollen. The team hopes to discover which of over 150 species of grasses in the UK have the largest effect on people’s health. This work, as part of the PollerGEN project, could lead to a detailed species-level pollen forecast, to help individuals better manage their condition.

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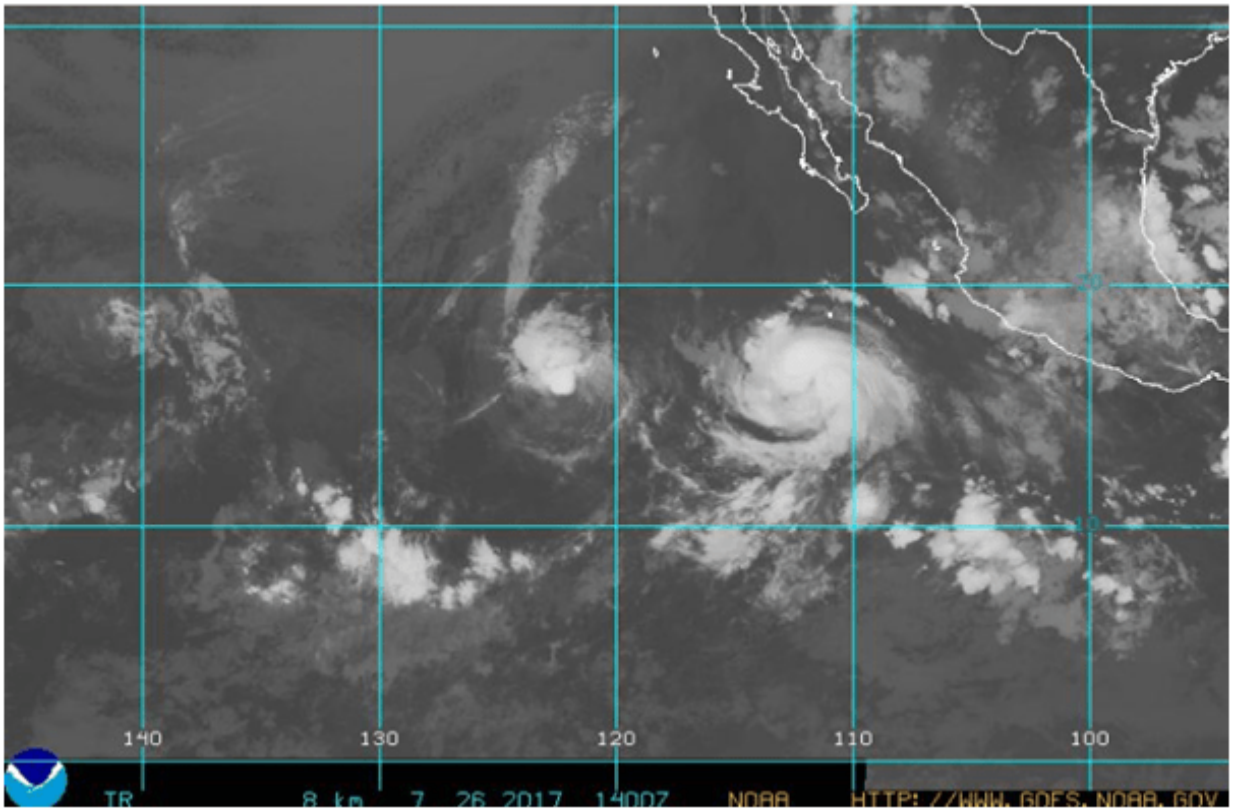
The Fujiwhara effect: When Tropical Cyclones go dancing

Description

Did you know that Tropical Cyclones sometimes go dancing? This interesting phenomena is called the Fujiwhara effect*, which can be seen this week in the Eastern Pacific Ocean off the coast of Mexico.



Hurricanes Hilary (right) and Irwin (left) in Eastern Pacific at 1400 UTC on 26 July 2017. Image courtesy of NOAA

Sometimes, when tropical cyclones get close to one another (within about 1,200km), they rotate around each other in an anti-clockwise direction (in the northern hemisphere). They tend to rotate around a point between them, rather like two dancers joining hands and spinning around, this is the Fujiwhara effect. If the Tropical Cyclones are of a similar size, then they can move around one another for perhaps up to a few days, then release and move away on their own paths, like the dancers letting go of each other's hands.

If the Tropical Cyclones are of different sizes, then the larger of the two will tend to dominate, with the smaller one orbiting around it, similar to the way in which the moon orbits around the Earth. Sometimes, the smaller Tropical Cyclone will be "eaten up" by the larger one. The two systems then essentially merge, with the smaller storm dissipating and the larger storm remaining and moving away on its own. This is what is expected to happen through Thursday and Friday this week, with Hurricane Irwin being consumed by the stronger and larger Hurricane Hilary. Hurricane Hilary is then expected to

move away to the northwest, before finally dissipating later this weekend.

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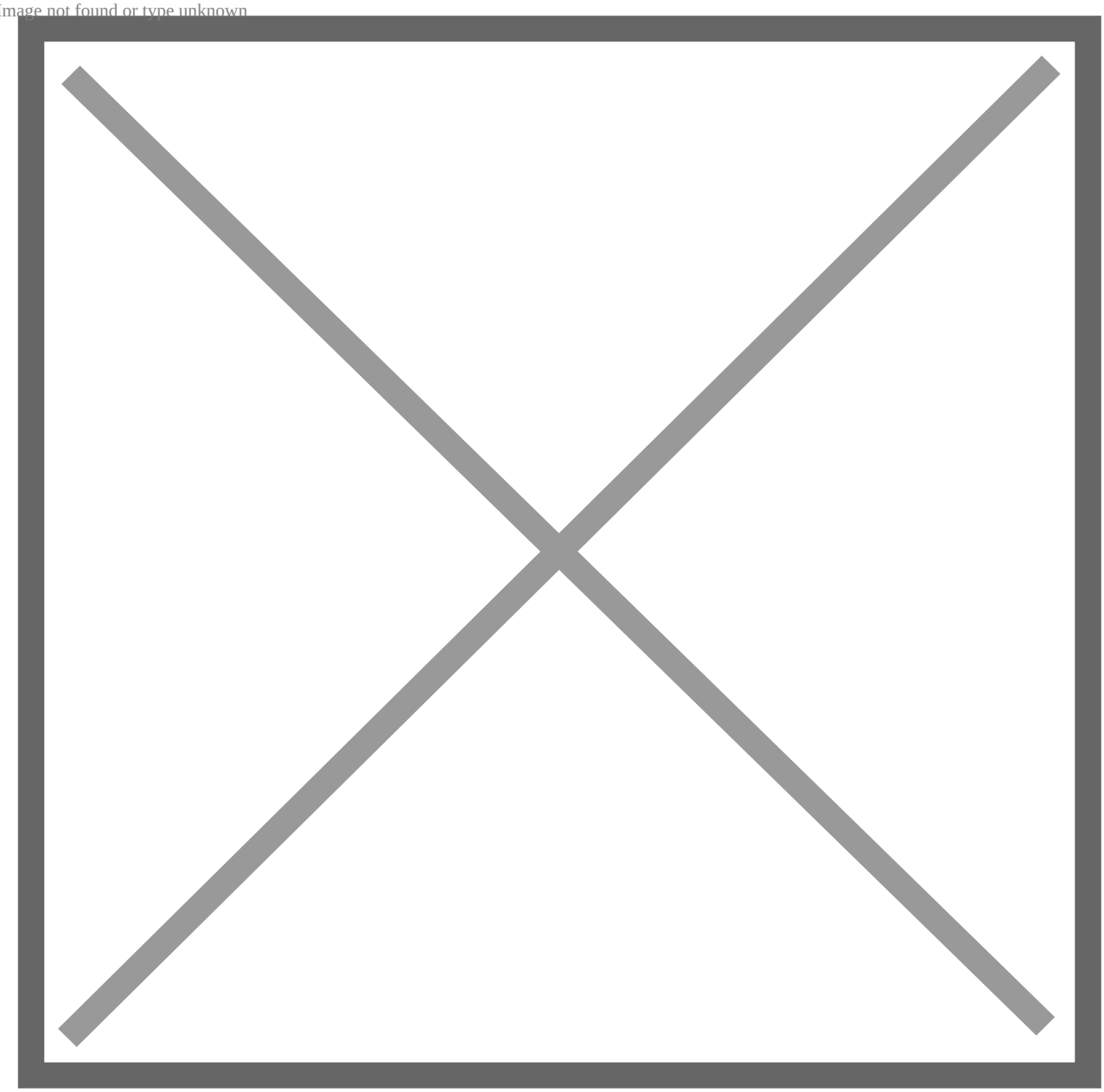

Forecast track showing Hurricane Hilary and Hurricane Irwin as they dumbell round each other

When Tropical Cyclones dance around each other due to the Fujiwhara effect, it can be challenging for numerical weather prediction models to accurately represent the interactions that the two Tropical Cyclones have with each other. In fact, if you get three Tropical Cyclones coming within close proximity of each other, they can all interact in a complex fashion, making forecasts even more difficult. The accurate forecast of Tropical Cyclones is very important as these storms can sometimes have huge impacts on tropical regions if they make landfall in populated areas. Fortunately, in this case, Hilaryand Irwin are forecast to stay well away from land, remaining instead over the open waters of theeastern Pacific, so are not expected to cause any significant impacts.

Further Information

For more information on Hurricanes Irwin and Hilary, including the official forecast tracks and warnings, please see the US National Hurricane Center's website.

The Met Office routinely supplies predictions of cyclone tracks from its global forecast model to regional meteorological centres worldwide, which are used along with guidance from other models in the production of forecasts and guidance. We also provide updates on current tropical storms via @metofficestorms on Twitter.

**The Fujiwhara effect was named after Sakuhei Fujiwhara, who described it in his 1921 paper about* symmetrical *motions in the atmosphere (http://onlinelibrary.wiley.com/doi/10.1002/qj.49704720010/pdf – QJRMetS, October 1921, pages 287-292)*

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